* NOTICES *

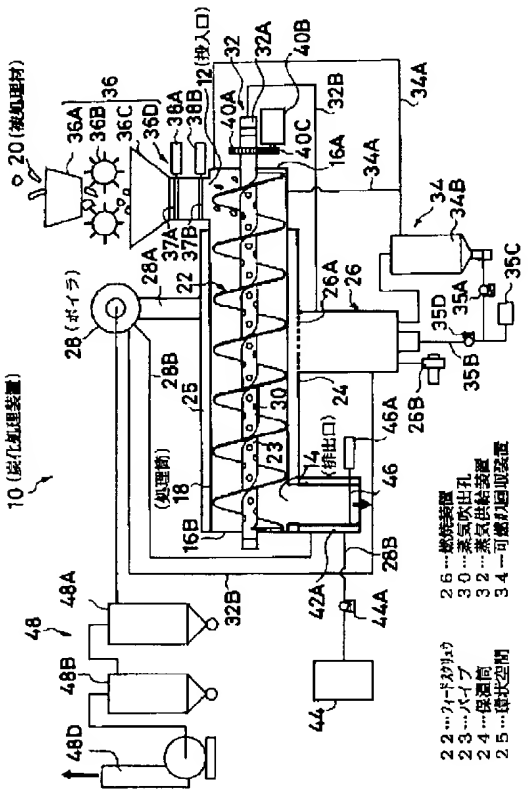
CLAIMS

[Claim(s)]
[Claim 1] The carbonization art of the organic substance which carbonizes the organic substance which heats so that the inside of a processing cylinder may become 300-500 degrees C from the outside of a processing cylinder through the peripheral wall, and is contained [while moving the processed material in a processing cylinder in the direction of an axis of a processing cylinder, and] in processed material, supplying 300-500-degree C dry steam in a processing cylinder.
[Claim 2] The carbonization art of the organic substance which leads the combustible gas generated by the pyrolysis of said processed material out of said processing cylinder, and is characterized by making it burn and heating the inside of a processing cylinder through said peripheral wall with the heat of combustion in claim 1.
[Claim 3] The carbonization art of the organic substance characterized by setting to claim 1 or 2 and making the elevated-temperature gas after heating of the processing cylinder peripheral wall besides said processing cylinder into a part of heat source [at least] for dry steam generating supplied in said processing cylinder.
[Claim 4] Within the processing cylinder which was equipped with the input port of processed material the seal possibility of and near the shaft-orientations end, and was equipped with the exhaust port of processed material near the other end, and this processing cylinder While generating a conveyance means to convey processed material from said input port to an exhaust port, and 300-500-degree C dry steam The carbonization processor of the organic substance which comes to have the steamy feeder which supplies this in said processing cylinder, and the external heating apparatus which heats a part of peripheral wall [at least] of said processing cylinder so that the inside of a processing cylinder may be maintained by 300-500 degrees C.
[Claim 5] The carbonization processor of the organic substance characterized by preparing the combustible-gas recovery system to which the combustible gas generated by the pyrolysis of the processed material within said processing cylinder is led as a fuel for said burner while using said external heating apparatus as the burner which heats the peripheral wall of a processing cylinder with the heat of combustion of a fuel in claim 1.
[Claim 6] It is the carbonization processor of the organic substance characterized by having the heat insulating mould to which said external heating apparatus surrounds a part of periphery [at least] of said processing cylinder in claim 4 or 5, and heating the peripheral wall of a processing cylinder by the inside of this heat insulating mould.
[Claim 7] The carbonization processor of the organic substance characterized by forming the elevated-temperature gas recovery equipment to which it is open for free passage in said heat insulating mould, and the elevated-temperature gas after processing cylinder heating in said external heating apparatus is led as a heat source of steamy generating in said steamy feeder in claim 6.
[Claim 8] It is the carbonization processor of the organic substance characterized by being the feed screw which turns to an exhaust port the processed material which said conveyance means penetrates the interior of a processing cylinder to shaft orientations in claim 4 thru/or either of 7, is arranged, and is

supplied from said input port, and conveys it.
[Claim 9] It is the carbonization processor of the organic substance characterized by having the steamy delivery pipe equipped with two or more steamy blowout holes suitably prepared in shaft orientations at spacing while said steamy feeder serves as the medial axis of said feed screw in claim 8.
[Claim 10] It is the carbonization processor of the organic substance characterized by coming to have the outside steamy delivery pipe which supplies a steam in a processing cylinder through two or more breakthroughs which said steamy feeder was attached in the periphery of said processing cylinder in claim 4 thru/or either of 9, and were formed in the peripheral wall of a processing cylinder.
[Claim 11] The processing cylinder by which it is the tube-like object arranged to the abbreviation horizontal direction, the upside near the shaft-orientations end was equipped with the exhaust port at input port and the bottom near the other end, respectively, and shaft-orientations ends were closed, The feed screw which turns the processed material free and supplied [shaft-orientations arrangement is carried out into this processing cylinder, and] to the circumference of a medial-axis line from said input port to said exhaust port, and conveys it, The tubed heat insulating mould which surrounded a part of peripheral wall [at least] of said processing cylinder, and has been arranged, The burner which is attached in this heat insulating mould and blows combustion gas into the space of that inside and the outside of said processing cylinder, The boiler made to generate a steam with the combustion gas discharged from said space, It is constituted including the pipe used as the medial axis of said feed screw, and two or more steamy blow-off holes formed in the pipe. The steamy feeder which supplies the steam generated by said boiler in a processing cylinder from said steamy blow-off hole as 300-500-degree C dry steam, The carbonization processor of the organic substance which comes to have the combustible-gas recovery system which collects the combustible gas generated by the pyrolysis and is supplied as a fuel for said burner within said processing cylinder.

[Translation done.]

Drawing selection Representative drawing



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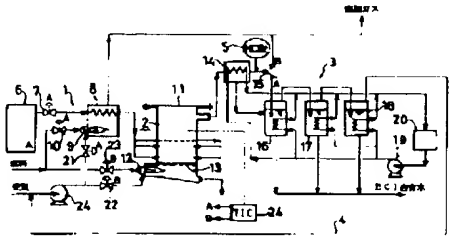
(54) **TREATMENT OF CHLORINE-CONTAINING PLASTIC WASTE AND DEVICE THEREFOR**

(57) Abstract:

PROBLEM TO BE SOLVED: To enable discharging of an incineration discharge gas into air by subjecting a chlorine-contg. plastic waste to dry distillation, absorbing the hydrogen chloride gas produced by the dry distillation to water to collect, and incinerating the carbon residue after the dry distillation.

SOLUTION: A waste of polyvinyl chloride products is put in a furnace 2 for dry distillation and incineration, then a boiler 6 and a heating furnace 8 are operated to produce an overheated vapor, which is supplied to the furnace 2 to dry distillate the waste. The discharged gas containing the overheated vapor, the gas produced by dry distillation and hydrogen chloride gas produced by dry distillation is sent through a gas cooling device 14, a hydrogen chloride concentration meter 6 and a switching valve 15 to a collecting device 3 for hydrogen chloride, where the discharged gas is successively introduced to bubble in three water tanks 16 to 18. Thereby, the overheated vapor in the discharged gas is condensed into water and recovered. The hydrogen chloride gas is absorbed by the water while the gas produced by dry distillation is passed through the water tank 18 and then supplied by a blower 24 to a burner of the heating furnace 8 with air for combustion. Thus, the gas produced by dry distillation is rendered harmless.



* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the carbonization approach of trash of having the dry distillation carbonization process of performing the dry distillation and the carbonization containing a kitchen garbage of trash, such as city dust and industrial waste, and the cooling process of the processing object.
[0002]
[Description of the Prior Art] In case trash is incinerated recently, the dioxin of a deadly poison occurs and it has become a big social problem. As a way stage which solves this, the art by dry distillation and carbonization of trash without an incineration process is taken up. And although heated with the indirect heating method by such carbonization approach, usually it is carried out in the condition that oxygen cannot be intercepted thoroughly, in dry distillation / carbonization furnace of trash.
[0003]
[Problem(s) to be Solved by the Invention] However, as compared with the conventional incineration art, the approach of carbonization processing has the following faults and is in the actual condition seldom adopted. That is, the time amount which ** processing takes is long, energy expenditure is large, there is much ** residue (ashes and carbide), ** carbonization gas (inflammable gas) occurs, and a fault, like there is danger of explosion is pointed out.
[0004] About the above-mentioned **, although all things were contained in trash, without sorting out [sludge / a kitchen garbage, a waste plastic wastepaper, fiber waste, tree waste,], the kitchen garbage especially with much moisture etc. required time amount for it at evaporation of moisture, and if a front face carbonizes further, since surface carbide will serve as a heat insulator and heat will not get across to inside, carbonization processing has taken long duration. Moreover, in carbonization processing, since it became the so-called indirect heating method which applies heat to a processing object from the exterior, intercepting an ambient atmosphere and calorific value of trash could not be effectively used like incineration processing, fuel consumption increased, and adoption of a carbonization art is checked greatly.
[0005] About the above-mentioned **, when carbonization processing of the trash is carried out, the carbide of ash content and many remains as residue, and adoption of a carbonization art is obstructed in the actual condition in which the deployment approach of carbide is not found that there is no other way but to dispose to a reclamation disposal field etc.
[0006] A lot of waste plastics are contained in trash about the above-mentioned **, if temperature is raised for carbonization processing, a waste plastic will evaporate, it becomes inflammable atmosphere, when handling is mistaken, there is risk of explosion, and the equipment which it is safe and can be treated also to whom is not put in practical use. Moreover, it is necessary to operate carbonization temperature from the risk of explosion below 400 degrees C made into the temperature to which carbonization gas does not explode, since carbonization temperature is not raised to 400 degrees C or more, the time amount which processing takes becomes long, and the fault of the above-mentioned ** is

made remarkable.
[0007] Therefore, the object of this invention is to offer the carbonization approach of the trash in which compaction of the processing time, the cutback of energy, loss in quantity and reduction of residue, and an explosion avoid accident are possible, maintaining the depressor effect of dioxin generating in view of the above-mentioned fault.
[0008]
[Means for Solving the Problem] The description configuration of this invention for attaining this object is in the condition which supplied high temperature steam and reduced the oxygen density in an ambient atmosphere, has the dry distillation carbonization process of performing dry distillation and carbonization of trash, and is in the point of having the cooling process which supplies moisture, cools a processing object and obtains carbide, after that. Here, since a processed material contains moisture, dry distillation is a concept also including the case where desiccation is also produced simultaneously.
[0009] In the above-mentioned configuration, it is more desirable than the below-mentioned operation effectiveness to use the gas which occurs at said dry distillation carbonization process as a fuel of generating of the heat energy added at said dry distillation carbonization process.
[0010] Moreover, it is more desirable than the below-mentioned operation effectiveness to have the fermentation process which ferments trash in advance of said dry distillation carbonization process.
[0011] And as for said fermentation process, it is more desirable than the below-mentioned operation effectiveness to be carried out whenever [processing temperature] at 40 degrees C or more less than 100 degrees C.
[0012] Moreover, it is more desirable than the below-mentioned operation effectiveness that dry distillation is performed among said dry distillation carbonization processes at 100-degree-C or more temperature in a tub of less than 400 degrees C, and carbonization is performed at 400-degree-C or more temperature in a tub of less than 800 degrees C.
[0013] In addition, it is more desirable than the below-mentioned operation effectiveness to carry out stirring said dry distillation carbonization process or said dry distillation carbonization process, and said fermentation process.
[0014] the [operation effectiveness] -- where it supplied high temperature steam for the dry distillation carbonization process and the oxygen density in an ambient atmosphere is reduced, in order to carry out under oxygen un-existing desirable -- substantial -- according to the above-mentioned description configuration of this invention, danger of explosion of carbonization gas can be lessened and, moreover, heating effectiveness is good by direct heating by high temperature steam. Moreover, in order to use high temperature steam, a drying effect is high, a steam causes carbide and a gas reaction further and large reduction and loss in quantity of carbide are attained. Furthermore, since it has the cooling process which supplies moisture, cools a processing object and obtains carbide, evaporation of moisture starts with the heat of a processing object at the time of cooling, since the latent heat of vaporization in that case is large, the cooling effectiveness of a processing object is high and steamy generating becomes effective also in explosion prevention. Moreover, when the carbide after cooling has potential heat, for example, the moisture which is carrying out water is seasoned naturally with this potential heat, deals with storage, packing, etc. and serves as easy carbide. Consequently, compaction of the processing time, the cutback of energy, loss in quantity and reduction of residue, and the carbonization approach of the trash in which an explosion avoid accident is possible were able to be offered, maintaining the depressor effect of dioxin generating.
[0015] Although the gas which occurs at a dry distillation carbonization process turns into gas of high energy when using the gas which occurs at said dry distillation carbonization process as a fuel of generating of the heat energy added at said dry distillation carbonization process, the energy expenditure of the whole equipment is more reducible by using it as the fuel of a steam's generating of this, and a fuel of steam heating.
[0016] When it has the fermentation process which ferments trash in advance of said dry-distillation carbonization process, it dehydrates, the internal water which kitchen garbages, such as a kitchen garbage contained in trash especially meat which is hard to carbonize, a fish, and vegetables, ferment by

moderate temperature and time amount, and an organization is destroyed, and is in in-houses, such as meat, a fish, and vegetables, becomes that the body tatters, and desiccation of an after process and carbonization become easy according to a fermentation process. Consequently, reduction and loss in quantity of carbide are promoted more. In addition, although a fermentation process becomes unnecessary when carbonizing paper, fiber, saw dust, etc., the carbonization approach of this invention shows the above remarkable effectiveness even in such a case.

[0017] Although the above-mentioned zymosis to the kitchen garbage contained in trash arises suitably when said fermentation process is performed whenever [processing temperature] at 40 degrees C or more less than 100 degrees C, it is more preferably carried out from this viewpoint at 70 degrees C or more less than 80 degrees C.

[0018] Although dry distillation and carbonization are phenomena which are originally hard to distinguish and may be simultaneously produced with mixture like trash when dry distillation is performed among said dry distillation carbonization processes at 100-degree-C or more temperature in a tub of less than 400 degrees C and carbonization is performed at 400-degree-C or more temperature in a tub of less than 800 degrees C By dividing both into the separate above-mentioned temperature, and performing them, evaporation of moisture and generating of carbonization gas can be made to be mainly able to perform suitably by the former, acceleration and the water gas reaction of carbonization can be made to mainly perform suitably by the latter, and generating gas can be further used effectively according to an individual. In addition, it is desirable that dry distillation is performed at 200 degrees C or more less than 350 degrees C, and carbonization is performed from this viewpoint at 500 degrees C or more less than 750 degrees C.

[0019] When carrying out stirring said dry distillation carbonization process or said dry distillation carbonization process, and said fermentation process, since thermal equalization, gas income and outgo, etc. are suitably performed in each process, the processing effectiveness in each process becomes good, and it leads to compaction of the processing time etc.

[0020]

[Embodiment of the Invention] The gestalt of operation of this invention is explained based on a drawing below. The example which performs the cooling process which supplies moisture in a tub, cools a processing object, and obtains carbide according to a batch format after carry out one by one within one tub while stir the dry-distillation carbonization process of perform dry distillation and carbonization of trash where it supplied the fermentation process and the high temperature steam which ferment trash with this operation gestalt and the oxygen density in an ambient atmosphere is reduce is show.

[0021] Drawing 1 shows the outline configuration of the facility concerning this invention, and the carbonization approach of this invention is performed in a tub 1. First, the outline configuration of a facility is explained. Trash input port 3 and the carbide exhaust port 4 are attached in the tub 1 possible [closing motion], and the gas combustion chamber 2 is equipped with the burner 5 and the exhaust port 6. The steam pipe 7 is formed in the outside of a tub 1. Although the driving gear 10 which drives the impeller 9 formed in the tub accompanies, the method which is made to rotate a tub 1 and is stirred is sufficient as a tub 1. The temperature controller 11 which controls the temperature in a tub 1 is formed in the burner 5. Moreover, it is lined by the gas combustion chamber 2 in the fireproof heat insulator 12. A boiler 20 supplies generating, now feed hopper 7a in a steam, and a steam is heated with combustion-gas heat within a steam pipe 7, turns into high temperature steam, and is emitted in a tub 1 from steamy diffuser 7b. After the gas in a tub 1 is discharged from gas exhaust 8 and preheating it by the heat exchanger 22, with a deodorization furnace 23, combustion deordorization is carried out by the burner 24, and it is emitted as exhaust gas. The exhaust gas which performed the temperature control in a deodorization furnace 23 with the temperature controller 25, and was discharged from the deodorization furnace 23 at that time is discharged by the induction fan 26, after being cooled by the heat exchanger 22.

[0022] Carrying out stirring mixing of trash and the zymogen with the impeller 9 in a tub, after throwing in trash and a zymogen and shutting the lid of input port 3 from the trash input port 3 established in the

upper part of a tub 1, with the burner 5 with which the gas combustion chamber 2 was equipped, a fermentation process keeps whenever [processing temperature] at about 70-80 degrees C, and holds it for about 1 to 3 hours. Then, in the kitchen garbage in trash, an organization is destroyed by initial fermentation, the internal water of an in-house dehydrates by it, and the body comes apart and is reduced greatly. In addition, since a fermentation process is usually performed at the above-mentioned temperature under existence of oxygen, supply of the steam by the boiler 20 is not performed.
[0023] Although a dry distillation carbonization process is performed after this fermentation process termination, it shows the example which divides dry distillation (evaporation of moisture and generating of carbonization gas are mainly pointed out), and carbonization (acceleration and the water gas reaction of carbonization are mainly pointed out) into separate temperature, and performs them. Although dry distillation is performed by holding the temperature in a tub at about 300 degrees C preferably for raising about 0.5 to 1 hour, the high temperature steam heated with exhaust gas heat is blown into a tub 1, and heating is performed. Thereby, the waste plastic in trash is gasified, as for tree waste, wastepaper, fiber waste, etc., carbonization starts, and a kitchen garbage is dried. It is cooled by the heat exchanger 22 and the combustion gas with which combustible content burns in a deodorization furnace 23, and the carbonization gas (a steam is included so much) which occurred contains a steam is emitted into atmospheric air.
[0024] Blowing into a tub the elevated-temperature steam generated by the supply of a steam by the boiler 20, and overheating by the burner 5, the carbonization performed after dry distillation carries out temperature up of the temperature in a tub to about 700 degrees C preferably, and is performed by holding for about 0.5 to 2 hours. Thereby, the trash in a tub is carbonized except for incombustibles, such as a metal and glass, and carbide is further decreased the quantity of and reduced substantially by the gas reaction by the steam. on the other hand, in a deodorization furnace 23, the gas which occurred by the gas reaction is alike, is sent, and burns, it is cooled by the heat exchanger 22 and the combustion gas is emitted into atmospheric air. Most fuel supply to a burner 24 becomes needlessness in that case.
[0025] Although a cooling process is performed after carbonization process termination, and carried out by injecting water from the water supply pipe 21 in a tub 1, extinguishing a burner 5 and stirring the processing object after carbonization When it does not ignite when carbide took out and takes out carbide out of a system after temperature fell at 100-150 degrees C, the contained moisture is seasoned naturally with the potential heat of carbide, and enables storage, packing, etc. for a short time. In addition, a cistern may be prepared down the carbide outlet 4 and a processing object may be cooled within the cistern.
[0026] Next, the effectiveness of these above operation gestalten is explained. Having trichotomized the process of processing and having made carbonization easy, when temperature up became possible in the carbonization process at insurance, the processing time was shortened to 3 by about 1/as compared with existing carbonization equipment. Moreover, fuel consumption was reduced to abbreviation 1/5 as compared with existing carbonization equipment having classified the holding time of temperature for every process, that the processing time has been shortened, and by generating inflammable gas and using this as a fuel by the reaction, further.
[0027] [Another operation gestalt] Another operation gestalt is explained below.
[0028] (1) The previous operation gestalt showed the example using the equipment which constitutes a gas combustion chamber and the body of equipment in one, as shown in drawing 1 , but as shown in drawing 2 , the equipment which constitutes both separately may be used. In that case, as shown in drawing 2 , carbonization gas installation tubing 8a which introduces carbonization gas into the gas combustion chamber 2 is attached, and it is [reduction / of a fuel] better than a tub 1 in drawing. According to this equipment, the gas which occurred by the gas reaction at the time of dry distillation will be sent to the gas combustion chamber 2, and will be used as a heat source which heats a tub 1, and the fuel used of the burner 5 with which the gas combustion chamber 2 was equipped will be reduced substantially.
[0029] Moreover, with the above-mentioned equipment, feed water of a steam pipe 7 is continued as it is after carbonization process termination, and the burner 5 formed in the gas combustion chamber is

extinguished. The water to which water is supplied by the steam pipe 7 shifts to water from a steam, and carbide is cooled by being injected in a tub 1. It can take out safely by checking that the temperature in a tub has become about 100-150 degrees C, and taking out carbide, without igniting in atmospheric air. In addition, if it takes out at this temperature, with the potential heat of carbide, it will season naturally in atmospheric air and handling will become easy as dry carbide. Moreover, since the inside of a tub is also cooled, it is possible to throw the following new trash into a tub in a quick phase.

[0030] (2) Although the previous operation gestalt showed the example which does not use the gas which occurs at a dry distillation carbonization process as a fuel of generating of a steam, the fuel used of a boiler may be reduced by supplying the above-mentioned gas to a boiler. In addition, the operation gestalt of the above (1) is equivalent to the gestalt which is reducing the fuel used for heating of a steam by supplying the above-mentioned gas to a gas combustion chamber.

[0031] (3) Although the previous operation gestalt showed the example which divides a dry distillation carbonization process into two steps, and performs it, where it supplied high temperature steam for the dry distillation and the carbonization like the above and the oxygen density in an ambient atmosphere is reduced, it may be made to carry out simultaneously. In that case, according to the amount and class of processed material, it is performed by suitable time amount at 500-750 degrees C of operating temperature.

[0032] (4) Although the previous operation gestalt showed the example which performs each process of fermentation, dry distillation, carbonization, and cooling in a batch format within the same tub, naturally, each process may be performed within a separate tub, it may connect continuously and each tub may be performed in a continuation format. When performing continuous system processing, the stirring furnace which has a rotary furnace equipped with a conveyance function, a partial extract device, etc. is used, and as the seal approach between each part, the rotating type feeder which can convey a processed material can be adopted, maintaining an airtight.

[0033] (5) Although the previous operation gestalt showed the example using the equipment with which a steam heating pipe is arranged at the periphery of a tub, as shown in drawing 3 , a steam heating pipe may be arranged to a deodorization furnace. In that case, the high temperature steam heated within the steam heating pipe 7 is emitted in a tub 1 from steamy diffuser 7b prepared in the tub 1 by the combustion gas produced with the deodorization furnace 23. In addition, with the equipment shown in drawing 3 , the combustion gas in a deodorization furnace 23 is used also as a heat source of the indirect heating of a tub 1.

[Translation done.]

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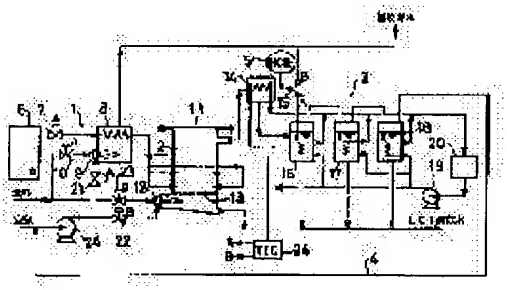
(54) TREATMENT OF CHLORINE-CONTAINING PLASTIC WASTE AND DEVICE THEREFOR

(57)Abstract:

PROBLEM TO BE SOLVED: To enable discharging of an incineration discharge gas into air by subjecting a chlorine-contg. plastic waste to dry distillation, absorbing the hydrogen chloride gas produced by the dry distillation to water to collect, and incinerating the carbon residue after the dry distillation.

SOLUTION: A waste of polyvinyl chloride products is put in a furnace 2 for dry distillation and incineration, then a boiler 6 and a heating furnace 8 are operated to produce an overheated vapor, which is supplied to the furnace 2 to dry distillate the waste. The discharged gas containing



the overheated vapor, the gas produced by dry distillation and hydrogen chloride gas produced by dry distillation is sent through a gas cooling device 14, a hydrogen chloride concentration meter 6 and a switching valve 15 to a collecting device 3 for hydrogen chloride, where the discharged gas is successively introduced to bubble in three water tanks 16 to 18. Thereby, the overheated vapor in the discharged gas is condensed into water and recovered. The hydrogen chloride gas is absorbed by the water while the gas produced by dry distillation is passed through the water tank 18 and then supplied by a blower 24 to a burner of the heating furnace 8 with air for combustion. Thus, the gas produced by dry distillation is rendered harmless.

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* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1] The art of the chlorine content plastic waste which distills a chlorine content plastic waste dryly, water is made to absorb the hydrogen chloride gas which occurred with dry distillation, collects, and incinerates carbon residue after dry distillation termination.
[Claim 2] The approach according to claim 1 of cooling the superheated steam after dry distillation and collecting as the water of condensation at a hydrogen chloride recovery process, using superheated steam as a heat source for dry distillation of a chlorine content plastic waste.
[Claim 3] The method according to claim 1 or 2 of using the carbonization gas which occurred by dry distillation as an auxiliary fuel for generating the heat source for dry distillation after hydrogen chloride recovery.
[Claim 4] It is an approach given in 1 term among claims 1-3 which perform incineration of carbon residue after measuring hydrogen chloride concentration between a dry distillation process and a hydrogen chloride recovery process and checking dry distillation termination with the obtained measured value.
[Claim 5] The processor of the chlorine content plastic waste which comes to provide the hydrogen chloride recovery system which makes water absorb the hydrogen chloride gas which occurred with dry distillation with dry distillation-cum-the incinerator which incinerates the carbon residue after dry distillation while distilling a chlorine content plastic waste dryly, and dry distillation-cum-the incinerator.
[Claim 6] Equipment according to claim 5 with which the superheated-steam generator which generates the superheated steam for dry distillation and is sent to dry distillation-cum-an incinerator is formed.
[Claim 7] Equipment according to claim 6 with which the line which sends the carbonization gas which occurred by dry distillation and passed the hydrogen chloride recovery system to a superheated-steam generator is prepared.
[Claim 8] It is equipment given in 1 term among claims 5-7 by which the hydrogen chloride concentration meter is formed between dry distillation-cum-the incinerator, and the hydrogen chloride recovery system.

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the processor for enforcing the method of processing efficiently the trash of chlorine content plastics like a polyvinyl chloride or a polyvinylidene chloride, and this approach.
[0002] Suppose that the trash of chlorine content plastics also means the trash of the composite with which at least the part besides the trash which consists only of chlorine content plastics consists of chlorine content plastics, or its product in this description.
[0003]
[Description of the Prior Art] Since it was easy to generate harmful dioxin while hydrogen chloride gas will occur so much, if incineration processing of this is carried out as it is, reclamation processing of the trash of chlorine content plastics was carried out conventionally [most].
[0004]
[Problem(s) to be Solved by the Invention] However, reservation of a reclaimed ground is becoming difficult gradually and a new processing measure is demanded.
[0005] This invention aims at offering the processor for enforcing the art and this approach of the chlorine content plastics which can meet the above-mentioned want.
[0006]
[Means for Solving the Problem] The art of the chlorine content plastic waste by this invention distills a chlorine content plastic waste dryly, makes water absorb the hydrogen chloride gas which occurred with dry distillation, are collected, and are characterized by incinerating carbon residue after dry distillation termination.
[0007] In this approach, preferably as a heat source for dry distillation of a chlorine content plastic waste, using superheated steam, the superheated steam after dry distillation is cooled and it collects as the water of condensation at a hydrogen chloride recovery process.
[0008] Moreover, the carbonization gas which occurred by dry distillation can also be used as an auxiliary fuel for generating the heat source for dry distillation after hydrogen chloride recovery.
[0009] After measuring hydrogen chloride concentration between a dry distillation process and a hydrogen chloride recovery process and checking dry distillation termination with the obtained measured value, it is desirable to perform incineration of carbon residue.
[0010] The equipment of a degree is used in order to enforce the art of the chlorine content plastic waste by this invention.
[0011] Namely, the processor of the chlorine content plastic waste which comes to provide the hydrogen chloride recovery system which makes water absorb the hydrogen chloride gas which occurred with dry distillation with dry distillation-cum-the incinerator which incinerates the carbon residue after dry distillation while distilling a chlorine content plastic waste dryly, and dry distillation-cum-the incinerator.
[0012] The equipment of the above-mentioned configuration possesses preferably the superheated-steam

generator which generates the superheated steam for dry distillation and is sent to dry distillation-cum-an incinerator. Moreover, the equipment of the above-mentioned configuration possesses preferably the line which sends the carbonization gas which occurred by dry distillation and passed the hydrogen chloride recovery system to a superheated-steam generator.
[0013] The hydrogen chloride concentration meter is preferably formed between dry distillation-cum-the incinerator, and the hydrogen chloride recovery system.
[0014]
[Embodiment of the Invention] First, the processor of the chlorine content plastic waste by this invention is explained based on a drawing.
[0015] The processor of the chlorine content plastic waste by this invention superheated-steam generator (1) which generates the superheated steam for dry distillation Superheated-steam generator (1) from -- dry distillation-cum-incinerator (2) which incinerates the carbon residue after dry distillation while distilling the trash of chlorine content plastics dryly with the superheated steam by which it comes dry distillation-cum-incinerator (2) Hydrogen chloride recovery system (3) which makes water absorb the hydrogen chloride gas which occurred with dry distillation the carbonization gas which occurred by dry distillation and passed the hydrogen chloride recovery system (3) -- superheated-steam generator (1) The line (4) to supply and dry distillation-cum-incinerator (2) Hydrogen chloride recovery system (3) Hydrogen chloride concentration meter (5) formed in between from -- it is mainly constituted.
[0016] superheated-steam generator (1) Boiler (6) Boiler (6) from -- steam valve (7) pass -- heating furnace (8) which heats the coming steam and generates superheated steam from -- it becomes. heating furnace (8) Burner (9) **** -- pass a fuel valve (10) -- a fuel should be supplied and pass an air valve (21) by the blower (24) -- combustion air is supplied.
[0017] Dry distillation-cum-incinerator (2) It is a longwise drum-like, and a crowning is equipped with a lid (11), and it has a burner (12) in a pars-basilaris-ossis-occipitalis 1 side, and has the grate (13) in internal soffit approach further. A fuel is supplied to a burner (12) through a fuel valve (23), and combustion air is supplied by the blower (24) through an air valve (22). heating furnace (8) from -- the superheated steam by which it comes -- the level on a grate (13) -- dry distillation-cum-incinerator (2) Injection supply is carried out toward a core from a peripheral wall inside. moreover, dry distillation-cum-incinerator (2) **** -- the temperature controller (24) which measures and controls the internal temperature is formed.
[0018] Dry distillation-cum-incinerator (2) In back wash, they are gas-cooling-method equipment (14) and a hydrogen chloride concentration meter (5). A diverter valve (15) and hydrogen chloride recovery system (3) It is prepared in this order.
[0019] Hydrogen chloride recovery system (3) It consists of three sets (16) of cisterns, (17), and (18), and bubbling of the gas by which it came from gas-cooling-method equipment (14) is carried out one by one by each tub. The cooling water involving these is circulated by three sets (16) of gas-cooling-method equipment (14) and cisterns, (17), and (18) with the pump (19) through a cooling tower (20).
[0020] Line (4) The carbonization gas which passed the last cistern (18) is passed through an air valve (21) by the blower (24), and it is a heating furnace (8). Burner (9) It sends.
[0021] dry distillation-cum-incinerator (2) **** -- the temperature controller (24) which measures and controls the internal temperature is formed.
[0022] In the processor of the chlorine content plastic waste of the above-mentioned configuration, the trash of a polyvinyl chloride product is first fed into dry distillation-cum-the incinerator (2). Subsequently, boiler (6) Superheated reactor (8) It works, superheated steam is generated and it is dry distillation-cum-an incinerator (2). Injection supply is carried out and dry distillation processing of predetermined time (30 minutes - 2 hours) and the trash is carried out by whenever [predetermined furnace temperature] (400 degrees C - 600 degrees C). This temperature control is based on the measurement temperature by the temperature controller (24), and is a superheated-steam generator (1). Steam valve (7) It carries out by adjusting automatically the aperture condition of a fuel valve (10) and an air valve (21).
[0023] About the exhaust gas containing the superheated steam used for dry distillation, the

carbonization gas which occurred by dry distillation, and the hydrogen chloride gas which occurred with dry distillation, it is dry distillation-cum-an incinerator (2). The gas-cooling-method equipment (14) from a crowning, and hydrogen chloride concentration meter (5) It reaches, a diverter valve (15) is minded and it is a hydrogen chloride recovery system (3). Delivery and this equipment (3) Bubbling is carried out to underwater [of three sets (16) of cisterns, (17), and (18)] one by one. the superheated steam in exhaust gas -- passage of gas-cooling-method equipment (14) -- it is cooled by bubbling of the cistern (16) of three occasions, (17), and (18), and is collected as the water of condensation by the water in a cistern. Moreover, hydrogen chloride gas is absorbed by water by bubbling of three sets (16) of cisterns, (17), and (18). Carbonization gas is not absorbed by water by bubbling of a cistern (16), (17), and (18). About the carbonization gas which passed the last cistern (18), it is a line (4). It passes through a valve (21) by the blower (24), and is a heating furnace (8) in combustion air. Burner (9) It supplies and is this burner (9). Defanging processing of carbonization gas is performed at the same time it uses as an auxiliary fuel.

[0024] dry distillation-cum-incinerator (2) from -- the hydrogen chloride concentration in the exhaust gas which came out -- the back wash of gas-cooling-method equipment (14) -- hydrogen chloride concentration meter (5) It measures. After checking that generating of hydrogen chloride gas was lost and dry distillation has been completed, It is an exhaust side (B) about a diverter valve (15). They are a switch and a superheated-steam generator (1) automatically with hand control. Steam valve (7) They are all closing, another side, and dry distillation-cum-an incinerator (2) about a fuel valve (10) and an air valve (10). A fuel valve (23) and an air valve (22) are opened. Subsequently, superheated-steam generator (1) A burner (12) is lit, whenever [furnace temperature] is controlled to predetermined temperature (800 degrees C or more), and incineration processing of the carbon residue which remained on the grate (13) is carried out. This temperature control is based on the measurement temperature by the temperature controller (24), and is dry distillation-cum-an incinerator (2). It carries out by adjusting automatically the aperture condition of a fuel valve (23) and an air valve (22). thus, each valve -- dry distillation mode (A) from -- incineration mode (B) Incineration processing of a switch and the carbon residue is carried out thoroughly. Consequently, carbon residue is dechlorinated thoroughly. Moreover, since the incineration gas which occurred does not contain hydrogen chloride gas, this gas can be emitted to atmospheric air as it is.

[0025]

[Effect of the Invention] This effect of the invention is as follows.

[0026] 1) Since distill a chlorine content plastic waste dryly, water is made to absorb the hydrogen chloride gas which occurred with dry distillation and it collects, hydrogen chloride gas is not contained in the incineration exhaust gas of the carbon residue after dry distillation, therefore this incineration exhaust gas can be discharged into atmospheric air as it is.

[0027] 2) Since one set of a furnace can perform dry distillation and subsequent incineration, the cost cut of the construction cost of equipment can be attained.

[0028] 3) By the approach of using superheated steam as a heat source for dry distillation, the amount of exhaust gas which should be processed can be substantially decreased by carrying out cooling condensation and collecting the superheated steam after dry distillation.

[0029] 4) By the approach of sending carbonization gas to a superheated-steam generator, reduction of a fuel can be aimed at using carbonization gas as an auxiliary fuel for this equipment, and combustion defanging processing of carbonization gas can be attained.

[Translation done.]

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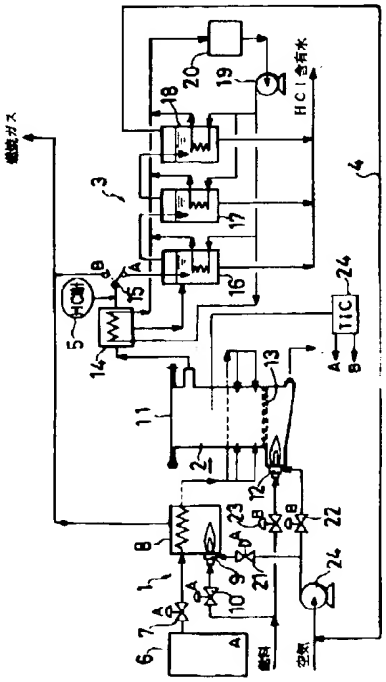
最終頁に続く

(54)【発明の名称】　塩素含有プラスチック廃棄物の処理方法およびその装置

(57)【要約】

【課題】　塩素含有プラスチックの廃棄物の新たな処理策を提供する

【解決手段】　塩素含有プラスチック廃棄物を乾留し、乾留に伴って発生した塩化水素ガスを水に吸収させて回収し、乾留終了後にカーボン残渣を焼却する。塩素含有プラスチック廃棄物の乾留用熱源として過熱蒸気を用い、乾留後の過熱蒸気を冷却し塩化水素回収工程で凝縮水として回収する。乾留によって発生した乾留ガスを塩化水素回収後に乾留用熱源を発生するための補助燃料として用いる。乾留工程と塩化水素回収工程の間で塩化水素濃度を測定し、得られた測定値によって乾留終了を確認した後、カーボン残渣の焼却を行う



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【特許請求の範囲】

【請求項1】　塩素含有プラスチック廃棄物を乾留し、乾留に伴って発生した塩化水素ガスを水に吸収させて回収し、乾留終了後にカーボン残渣を焼却する塩素含有プラスチック廃棄物の処理方法

【請求項2】　塩素含有プラスチック廃棄物の乾留用熱源として過熱蒸気を用い、乾留後の過熱蒸気を冷却し塩化水素回収工程で凝縮水として回収する請求項1記載の方法

【請求項3】　乾留によって発生した乾留ガスを塩化水素回収後に乾留用熱源を発生するための補助燃料として用いる請求項1または2記載の方法

【請求項4】　乾留工程と塩化水素回収工程の間で塩化水素濃度を測定し、得られた測定値によって乾留終了を確認した後、カーボン残渣の焼却を行う請求項1～3のうちの1項記載の方法

【請求項5】　塩素含有プラスチック廃棄物を乾留するとともに乾留後のカーボン残渣を焼却する乾留兼焼却炉と、乾留兼焼却炉で乾留に伴って発生した塩化水素ガスを水に吸収させる塩化水素回収装置を具備してなる塩素含有プラスチック廃棄物の処理装置

【請求項6】　乾留用の過熱蒸気を発生して乾留兼焼却炉へ送る過熱蒸気発生装置が設けられている請求項5記載の装置

【請求項7】　乾留によって発生し塩化水素回収装置を通過した乾留ガスを過熱蒸気発生装置へ送るラインが設けられている請求項6記載の装置

【請求項8】　乾留兼焼却炉と塩化水素回収装置の間に塩化水素濃度計が設けられている請求項5～7のうちの1項記載の装置

【発明の詳細な説明】

【0001】

【発明の属する技術分野】この発明は、主に塩化ビニルや非塩化ビニルなどの、のような塩素含有プラスチックの廃棄物を効率よく処理する方法およびこの方法を実施するための処理装置に関するものである

【0002】この明細書において、塩素含有プラスチックの廃棄物とは、塩素含有プラスチックのみからなる廃棄物のほか、少なくとも一部が塩素含有プラスチックで構成されている複合材ないしはその製品の廃棄物をも意味するものとする

【0003】

【従来の技術】塩素含有プラスチックの廃棄物は、これをそのまま焼却処理すると塩化水素ガスが多量に発生するとともに有害なダイオキシンが発生しやすいために、従来はほとんど埋立て処理されていた

【0004】

【発明が解決しようとする課題】しかし、埋立て地の確保は年々困難になって来ており、新たな処理法が求められている

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【0005】この発明は上記の要望に応えることができる塩素含有プラスチックの処理方法およびこの方法を実施するための処理装置を提供することを目的とする

【0006】

【課題を解決するための手段】本発明による塩素含有プラスチック廃棄物の処理方法は、塩素含有プラスチック廃棄物を乾留し、乾留に伴って発生した塩化水素ガスを水に吸収させて回収し、乾留終了後にカーボン残渣を焼却することを特徴とする

【0007】この方法において、塩素含有プラスチック廃棄物の乾留用熱源として好ましくは過熱蒸気を用い、乾留後の過熱蒸気を冷却し塩化水素回収工程で凝縮水として回収する

【0008】また、乾留によって発生した乾留ガスを塩化水素回収後に乾留用熱源を発生するための補助燃料として用いることもできる

【0009】乾留工程と塩化水素回収工程の間で塩化水素濃度を測定し、得られた測定値によって乾留終了を確認した後、カーボン残渣の焼却を行うことが好ましい

【0010】本発明による塩素含有プラスチック廃棄物の処理方法を実施するには、次の装置を用いる

【0011】すなわち、塩素含有プラスチック廃棄物を乾留するとともに乾留後のカーボン残渣を焼却する乾留兼焼却炉と、乾留兼焼却炉で乾留に伴って発生した塩化水素ガスを水に吸収させる塩化水素回収装置を具備してなる塩素含有プラスチック廃棄物の処理装置

【0012】上記構成の装置は、好ましくは、乾留用の過熱蒸気を発生して乾留兼焼却炉へ送る過熱蒸気発生装置を具備している。また、上記構成の装置は、好ましくは、乾留によって発生し塩化水素回収装置を通過した乾留ガスを過熱蒸気発生装置へ送るラインを具備している

【0013】乾留兼焼却炉と塩化水素回収装置の間に好ましくは塩化水素濃度計が設けられている

【0014】

【発明の実施の形態】まず、この発明による塩素含有プラスチック廃棄物の処理装置について、図面に基づいて説明をする。

【0015】この発明による塩素含有プラスチック廃棄物の処理装置は、乾留用の過熱蒸気を発生する過熱蒸気発生装置(1)と、過熱蒸気発生装置(1)から送る過熱蒸気によって塩素含有プラスチックの廃棄物を乾留するとともに乾留後のカーボン残渣を焼却する乾留兼焼却炉(2)と、乾留兼焼却炉(2)で乾留に伴って発生した塩化水素ガスを水に吸収させる塩化水素回収装置(3)と、乾留によって発生し塩化水素回収装置(3)を通過した乾留ガスを過熱蒸気発生装置(1)へ供給するライン(4)と、乾留兼焼却炉(2)と塩化水素回収装置(3)の間に設けられた塩化水素濃度計(5)とから主として構成されている

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【００１６】過熱蒸気発生装置(1)は、ボイラ(6)と、ボイラ(6)から水蒸気弁(7)を経て来る水蒸気を加熱して過熱蒸気を発生する加熱炉(8)とからなる。加熱炉(8)のバーナ(9)には燃料弁(10)を経て燃料が供給され、ブロワ(21)によって空気弁(21)を経て燃焼用空気が供給される。

【００１７】乾留兼焼却炉(2)は、縦長タイプ炉であって、頂部に蓋体(11)を備え、底部一側にバーナ(12)を有し、さらに内部上端寄りに火格子(13)を有している。バーナ(12)には燃料弁(23)を経て燃料が供給され、ブロワ(21)によって空気弁(22)を経て燃焼用空気が供給される。加熱炉(8)から来る過熱蒸気は火格子(13)の上方へ向けて乾留兼焼却炉(2)内に周壁から中心部に向いて噴射供給される。また、乾留兼焼却炉(2)にはその内部温度を測定してコントロールする温度制御装置(24)が設けられている。

【００１８】乾留兼焼却炉(2)の後流にはガス冷却装置(14)と塩化水素濃度計(5)と切り換え弁(15)と塩化水素回収装置(3)とがこの順に設けられている。

【００１９】塩化水素回収装置(3)は、３基の水槽(16)(17)(18)からなり、ガス冷却装置(14)からの排ガスが各槽を順次バブリングされる。ガス冷却装置(14)と３基の水槽(16)(17)(18)にはこれらを巡る冷却水ラインが、ポンプ(20)を経てポンプ(19)によって循環させられている。

【００２０】ライン(4)は、最終の水槽(18)を通過した乾留ガスをブロワ(24)によって空気弁(21)を経て加熱炉(8)のバーナ(9)へ送る。

【００２１】乾留兼焼却炉(2)にはその内部温度を測定してコントロールする温度制御装置(24)が設けられている。

【００２２】上記構成の塩素含有プラスチック廃棄物の処理装置において、まず、乾留兼焼却炉(2)に予め塩化ビニル製品の廃棄物を投入しておく。次いでボイラ(6)と過熱炉(8)を稼働して過熱蒸気を発生させ、乾留兼焼却炉(2)に噴射供給して、所定炉内温度（４００℃～６００℃）にて所定時間（３０分～２時間）、廃棄物を乾留処理する。この温度コントロールは、温度制御装置(24)による測定温度に基づいて過熱蒸気発生装置(1)の水蒸気弁(7)、燃料弁(10)および空気弁(21)の開き具合を自動的に調整することによって行う。

【００２３】乾留に用いた過熱蒸気と乾留によって発生した乾留ガスと乾留に伴って発生した塩化水素ガスとを含む排ガスを、乾留兼焼却炉(2)の頂部からガス冷却装置(14)、塩化水素濃度計(5)および切り換え弁(15)を介して塩化水素回収装置(3)へ送り、同装置(3)の３基の水槽(16)(17)(18)の水中に順次バブリングする。排ガス中の過熱蒸気はガス冷却装置(14)の通過中において３基の水槽(16)(17)(18)でのバブリングによって冷却され、凝縮水として水槽内の水に回収される。また、塩化水素ガスは３基の水槽(16)(17)(18)でのバブリングによって水に吸収される。乾留ガスは水槽(16)(17)(18)でのバブリングでは水に吸収されない。最終の水槽(18)を通過した乾留ガスを、ライン(4)によってブロワ(24)で弁(21)を経て燃焼用空気と共に加熱炉(8)のバーナ(9)へ供給し、同バーナ(9)の補助燃料として用いると同時に、乾留ガスの無害化処理を行う。

【００２４】乾留兼焼却炉(2)から出る排ガス中の塩化水素濃度をガス冷却装置(14)の後流で塩化水素濃度計(5)で測定し、塩化水素ガスの発生がなくなって乾留が終了したことを確認した後、切り換え弁(15)を排気側(8)へ手動できるに自動的に切り換え、過熱蒸気発生装置(1)の水蒸気弁(7)、燃料弁(10)および空気弁(10)をいずれも閉じ、他方、乾留兼焼却炉(2)の燃料弁(23)および空気弁(22)を閉じ、ついで、過熱蒸気発生装置(1)のバーナ(12)を点火し、炉内温度を所定温度（８００℃以上）にコントロールし、火格子(13)上に残ったカーボン残渣を焼却処理する。この温度コントロールは、温度制御装置(24)による測定温度に基づいて乾留兼焼却炉(2)の燃料弁(23)および空気弁(22)の開き具合を自動的に調整することによって行う。このようにして、弁を乾留ライン(A)から焼却ライン(B)へ切り換え、カーボン残渣を完全に焼却処理する。その結果、カーボン残渣は完全に脱塩素化されている。また、発生した焼却ガスは塩化水素ガスを含まないので、同ガスをそのまま大気に放出できる。

【００２５】

【発明の効果】この発明の効果には次のとおりである。

【００２６】１）塩素含有プラスチック廃棄物を乾留し、乾留に伴って発生した塩化水素ガスを水に吸収させて回収するので、乾留後のカーボン残渣の焼却排ガスには塩化水素ガスが含まず、したがってこの焼却排ガスをそのまま大気中へ排出することができる。

【００２７】２）乾留とその後の焼却とを１基の炉で行うことができるので、装置の建設費のコストダウンが達成できる。

【００２８】３）乾留用の熱源として過熱蒸気を使用する方法では、乾留後の過熱蒸気を冷却凝縮して回収することによって、処理すべき排ガス量を大幅に減少させることができる。

【００２９】４）乾留ガスを過熱蒸気発生装置へ送る方法では、乾留ガスを同装置の補助燃料として用いて燃料の節減を図り、乾留ガスの燃焼無害化処理を達成することができる。

【図面の簡単な説明】

【図１】本発明の実施例を示す管系統図である。

【符号の説明】

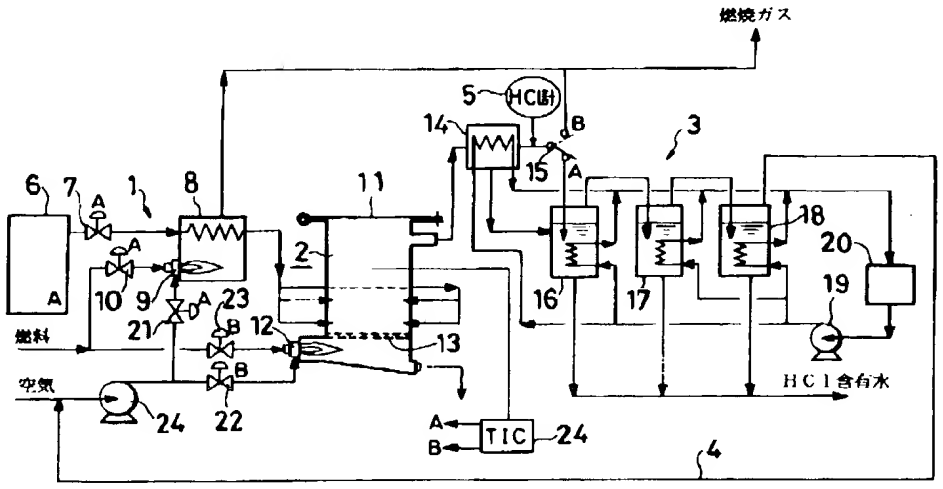
１：過熱蒸気発生装置

２：乾留兼焼却炉

３：塩化水素回収装置

4：ライン　　＊　＊5：塩化水素濃度計

【図1】



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